

We Claim:

1. A protection relay for a power line system where current on a bus is provided to one or more power lines for receiving and generating power, and  
5 where associated with each of said power lines is a current transformer for providing a line signal current representative of current flowing through a respective line, and wherein said protection relay is operative for generating a trip signal in response to a detected power signal line fault, the protection relay comprising:

10 signal processor responsive to signal line currents for generating a trip signal in response to a detected fault on any one of power lines;  
means for summing said signal line current, separately for each power line phase, for all power lines coupled to said bus and producing,  
a first signal indicative of the phasor sum of all signal line currents,  
15 and  
a second signal representative of the magnitude sum of all signal line currents;  
means for deriving,  
a first time derivative signal representative of the first derivative of  
20 said first signal, and  
a first time derivative signal representative of the first derivative of said second signal;  
means for deriving,

a first harmonic signal representative of the a selected harmonic of  
said first time derivative signal, and

a second harmonic signal representative of the a selected  
harmonic of said second time derivative signal;

5 means for determining the harmonic phase difference between said first  
and second harmonic signals;

phase comparator means responsive to said harmonic phase difference  
for selectively generating, a blocking signal for blocking said trip  
signal if said harmonic phase difference satisfies a first condition;

10 and

trip signal generator responsive to said first and second signals for  
generating a fault trip signal upon said first and second signals  
being beyond a defined bus differential characteristic conditioned  
upon the status of said blocking signal.

15

2. A protection relay for a power line system were current on a bus is  
provided to one or more power lines for receiving and generating power, and  
where associated with each of said power lines is a current transformer for  
providing a line signal current representative of current flowing through a  
20 respective line, and wherein said protection relay is operative for generating a  
trip signal in response to a detected power signal line fault, the protection relay  
comprising:

signal processor responsive to signal line currents for generating a trip  
signal in response to a detected fault on any one of power lines;

means responsive to said signal line currents for detecting current  
transformer saturation; and

means for selectively generating a blocking signal for blocking said trip  
signal in response to detection of current saturation of said current  
transformer.

5